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Masoud Bajestani
Site Vice President
Sequoyah Nuclear Plant

April 19, 2000

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

10 CFR 50.73

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT (SQN) UNIT 1 - DOCKET NO. 50-327 - FACILITY OPERATING LICENSES DPR-77 - LICENSEE EVENT REPORT (LER) 50-327/2000003

The enclosed report provides details concerning an automatic reactor trip as a result of a detected loss of excitation field to the main generator, although the condition did not exist, causing a turbine trip. This event is being reported, in accordance with 10 CFR 50.73(a)(2)(iv), as an event that resulted in an automatic actuation of engineered safety features including the reactor protection system.

Sincerely,

M. Bajestani

Masoud Bajestani

Enclosure
cc: See page 2

IE22

Enclosure
cc (Enclosure):

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NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Sequoyah Nuclear Plant (SQN) UNIT 1	05000327	1 OF 6

TITLE (4)
Reactor Trip Caused from a Detected Loss of Excitation Field to the Main Generator Because of a Design Error

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									NA	05000
03	21	2000	2000	-- 003 --	00	04	19	2000	FACILITY NAME NA	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
			20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)	076		20.2203(a)(1)		20.2203(a)(3)(I)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
J. W. Proffitt, Licensing Engineer	(423) 843-6651

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

Abstract (Limit to 1400 paces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 21, 2000, at 0440 Eastern standard time (EST), Unit 1 experienced an automatic reactor trip. The reactor trip was initiated by a turbine trip which was caused by a detected loss of excitation field to the main generator. The turbine trip signal was caused by the actuation of two protective relays that were installed during the refueling outage. A wiring error contained in the design change package resulted in improper installation in the field. The wiring error resulted in actuation of the relays during unit restart when a loss of excitation condition did not exist. The root cause of the design error was an error by the package preparer that was not detected by the barriers in place to prevent the design deficiency. The design change checking, design verifications, and reviews were not completed to the proper level. The design error was corrected. A standdown meeting, to clarify expectations for design checkers and design verifiers, was held with Design Engineering personnel. A training letter, addressing expectations for design checkers and design verifiers, was issued to the SQN Design Engineering personnel.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

I. PLANT CONDITION(S)

Unit 1 was in power operation at approximately 76 percent.

II. DESCRIPTION OF EVENT

A. Event:

On March 21, 2000, at 0440 Eastern standard time (EST), Unit 1 experienced an automatic reactor trip. The reactor trip was initiated by a turbine trip, which was caused by a detected loss of excitation field to the main generator [EIIS Code TB].

The turbine trip signal was caused by the actuation of two protective relays that were installed during the refueling outage. These relays are designed to detect a loss of excitation and operate to trip the main turbine and main generator output breakers and isolate the generator from the switchyard system. A wiring error contained in the design change package resulted in improper installation in the field. The wiring error resulted in actuation of the relays during unit restart when a loss of excitation condition did not exist. The main control room operators took appropriate actions to stabilize the reactor in hot standby (Mode 3).

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

C. Dates and Approximate Times of Major Occurrences:

March 17, 2000	A modification change was implemented to install two protective relays to detect a loss of excitation.

March 21, 2000, at 0440 EST	A turbine trip with a subsequent reactor trip occurred. The main control room operators took appropriate actions, in accordance with the emergency operating procedures, to stabilize the reactor in Mode 3.

D. **Other Systems or Secondary Functions Affected:**

None.

E. **Method of Discovery:**

The reactor and turbine trips were annunciated on the main control room panels.

F. **Operator Actions:**

Control room operators responded to the reactor and turbine trips as prescribed by emergency procedures. They promptly diagnosed the condition and took appropriate actions to stabilize and maintain the unit in a safe condition.

G. **Safety System Responses:**

The reactor protection systems, including feedwater isolation and auxiliary feedwater start, responded to the trip, as designed.

III. CAUSE OF THE EVENT

A. **Immediate Cause:**

The immediate cause of the turbine and reactor trips was the actuation of two protective relays initiated by a detected loss of excitation field, when a loss of excitation condition did not exist, to the main generator.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

B. **Root Cause:**

A design change, adding two protective relays to detect a loss of excitation field, contained a wiring error. The design change was installed during the last refueling outage. The protective relays are designed to detect a loss of excitation and operate to trip the main turbine and main generator output breakers and isolate the generator from the switchyard system. The root cause of the design error was an error by the package preparer, that was not detected by the barriers in place to prevent the design deficiency. The design change checking, design verifications, and reviews were not completed to the proper level.

C. **Contributing Factor:**

The postmodification testing did not verify the functionality of the design for the devices.

IV. ANALYSIS OF THE EVENT

The plant safety systems responses during and after the unit trip were bounded by the responses described in the Final Safety Analysis Report. Therefore, this event did not adversely affect the health and safety of plant personnel or the general public.

V. CORRECTIVE ACTIONS

A. **Immediate Corrective Actions:**

The design error was corrected.

B. **Corrective Actions to Prevent Recurrence:**

Coaching and counseling of the personnel involved was performed.

A standdown meeting, to clarify expectations for design checkers and design verifiers, was held with Design Engineering personnel.

A training letter, addressing expectations for design checkers and design verifiers, was issued to the SQN Design Engineering personnel.

Additional actions are being performed to strengthen the design control process and post modification testing. These actions are being tracked in the Corrective Action Program.

VI. ADDITIONAL INFORMATION

A. Failed Components:

None

B. Previous LERs on Similar Events:

A review of previous reportable events for the past three years did not identify any previous events involving an inadequate design.

C. Additional Information:

Following the reactor trip signal, the main feedwater system experienced a water-hammer near the main feedwater pumps.

The main feedwater pumps tripped off, as expected, following the trip but experienced high vibration. The associated recirculation valves went full open. The low pressure steam supply valves to the turbines went closed; however, the high pressure steam stop valve for main feedwater pump turbine 1B was leaking through. In this condition, the main feedwater still had enough motive steam available to overspeed the 1B pump/turbine assembly resulting in the high vibration and damage to the pump/turbine assembly.

Corrective actions concerning the water-hammer and damage to the main feedwater pump assembly are being tracked in the Corrective Action Program.

D. **Safety System Functional Failure:**

This event did not result in a safety system functional failure in accordance with NEI 99-02.

VII. COMMITMENTS

None.